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The Bureau of Sugar Experiment Stations. Review of the Year's Work.

DURING the war period when the Bureau field staff was reduced by enlistments from thirteen to four men the extent of field experimental work was drastically curtailed and it was only as the result of exceptional effort on the part of the skeleton staff that the Experiment Stations were enabled to carry on their functions. With the return of all staff from the war, field work was steadily resumed and this section of the Bureau now has a numerical strength of twelve men actively and fully occupied on field experimentation in addition to a plant breeder and two entomologists whose time is partly devoted to field trial work relating to varieties, insecticides, &c. During the past year field investigations have caught up with the pre-war scale of work and in certain branches have established new high standards in the number of trials being planted and harvested.

Although canegrowers resident in areas in close proximity to Experiment Stations have some conception of the work being carried out within the industry the majority of farmers are not conversant with the scale of the work which is proceeding and it is considered advisable, by means of yearly stocktaking, to describe what is being done in the fields of soil amendments, varieties, insect pests and diseases, &c., to improve the standards of the industry and to show the manner in which Bureau funds are being utilized.

North of Townsville Areas.

In this very important cane-producing area the emphasis has recently been placed on field trials to evaluate "Gammexane" for cane grub control and on varietal plantings and trials to assess the qualities of new seedling canes. The following table illustrates the range and number of these experiments. The large number of "Gammexane" trials has been found necessary so that as much information as possible can be gathered in the minimum of time. The trials include investigations into the best methods of applying the insecticide, the optimum amount to apply, the best diluent to use, the amount and extent of residual

toxicity to grubs, and the effects of varying amounts per acre on cane germination, root development and growth. Considerable numbers of this type of trial are essential as it cannot be accurately predicted at the time of "Gammexane" application that the trial area will become grub infested. One of the most valuable features of this insecticide is its lasting effect in the soil. A crop at Highleigh in the Gordonvale area was treated with 100 lb. per acre of 10 per cent. dust in November, 1946, but no infestation occurred, and without any further addition of "Gammexane" the residual toxicity of the material was such that a high degree of grub control was obtained in the first half of 1948. In this trial the 100-lb.-per-acre dressing of "Gammexane" yielded 6·6 tons of cane per acre more than the untreated plots. The results of these trials, many of which have yielded similar results to that quoted above, will be published separately, but already the future of the "Gammexane" treatment is assured in all grub-affected areas.

TABLE OF FIELD EXPERIMENTS PLANTED AND HARVESTED NORTH OF TOWNSVILLE DURING 1948.

Type of trial.	No. planted.	No. harvested.
Fertility trials (lime)	..	18
Fertility trials (nitrogen)	..	12
Fertility trials (general)	4	2
Varietal trials (replicated)	5	24
Varietal trials (observation)	26	55
Varietal propagation plots	97	..
Green manure trials	4	..
Isolation plots	2	..
Disease resistance trials	2	3
Cultivation trials	..	2
Fertility surveys	2	..
Ant control trial	1	..
" Gammexane " trials	54	..
Defoliation trial	1	..

The value of this product to growers in grub-affected areas is impossible to estimate but several individual farmers, during the 1948 season, stated that it had meant from £700 to £1,000 extra to them in crop increases.

Probably next in importance to the grub control work can be placed the extensive varietal trial programme associated with our cane breeding activities. In the table above it will be seen that 31 varietal trials were planted and 79 harvested during the year in the north of Townsville districts. The scale of this work emphasizes the efforts which are being made to produce and distribute varieties which can outyield the present-day standards. Results of some of the more informative of these trials are published elsewhere in this Bulletin and others will appear in the April number. It has always been felt a weakness of our plant breeding programme that canes were raised and selected at Meringa for the wet Babinda-Innisfail belt. This has now been overcome by the establishment of a special seedling sub-station at Bartle Frere where seedling canes are grown, selected and propagated for the local environment.

An investigation, started two years ago, into lime requirements of acid soils is beginning to bear fruit. Eighteen trials were harvested

in the far north in 1948 and the results will provide a much sounder basis for liming recommendations in the future. Twelve special fertilizer trials to investigate the value of nitrogen applications in the drill at planting time as against later top-dressings were also harvested and these will be summarized in a separate article. In addition four fertilizer trials were planted and two harvested as part of the permanent programme of general fertilizer investigation work. Fertility surveys were carried out in two selected areas where it was desired to know more regarding certain soil types and in each of these areas fertilizer trials were established.

Green manuring received an impetus during the year as the result of the publicity given by the Bureau to Reeve's Selection and Cristaudo pea—both resistant to "wilt" and bean-fly. Four trials with these varieties and with velvet beans were planted in the district.

Two isolation plots are maintained in the far north. The purpose of these plots is to act as disease interception depots when transferring canes from one quarantine district to another. Both plots are in isolated areas, miles from commercial cane and any variety being transferred from say Gordonvale to Innisfail or to Central or South Queensland is planted in one of these plots and grown under inspection for a year before it is sent on. If disease shows up within the year the cane is destroyed. Such plots in various parts of the sugar belt have intercepted disease on more than one occasion.

To test all new varieties against disease certain disease resistance trials were conducted during the year. Two such trials were planted and three harvested. Gumming disease, leaf scald and chlorotic streak still exist in North Queensland and it is yet too early to state with certainty that downy mildew has been eliminated. Disease resistance trials are therefore essential to assess the susceptibility or resistance of all new and promising varieties to these ailments and thus guard against the distribution of some variety which might prove too susceptible for commercial production.

Lower Burdekin Area.

In this area of fertile alluvial soil with no major cane diseases, less pressing fertilizer problems, and lower pest incidence than the far north the scale of experimental work is correspondingly reduced, but field trials are constantly under way in an attempt to improve production.

Such areas as are subject to grub attack are being treated with "Gammexane" and the 1948 programme included five trials to investigate optimum rates of application and best methods of applying the insecticide under irrigated conditions. The Lower Burdekin has a good selection of mid-season maturing varieties and the emphasis is being placed on the introduction and testing of any canes with promise of early maturity. To this end five varietal trials were planted during 1948 and seven trials harvested. In addition, 13 propagation plots of promising canes were planted out.

Attention was paid to green manuring improvement by the planting of new cowpea and velvet-bean varieties. This farming practice is capable of considerable extension in the Lower Burdekin as a source

of supply of nitrogen which is the only serious deficiency in the soils, and as a soil amendment to overcome the serious problem of poor water penetration which is becoming a factor in crop limitation on much of the irrigated land.

A considerable amount of work was done on the dipping of plants in mercurial preparations to ensure protection against pineapple disease. So effective has this treatment proved that it is now standard practice on the Down River farms of the Inkerman area. Preliminary investigations have also been made into certain poor strikes which were widespread during 1948, particularly in early plantings of all varieties. This preliminary work will form the basis for extensive trials in the coming year. One of the Bureau's early seedling productions, S.J.16, is now becoming a major variety in the Lower Burdekin and is displacing E.K. 28 from its place of importance in the varietal census.

Mackay-Proserpine.

In the central district the outstanding feature of the year's work is the phenomenal success achieved by the variety Q.50. This Mackay-bred seedling cane has been accepted so enthusiastically by the growers that it will have no serious rival in the area within twelve months. Its resistance to district diseases, its good early sugar content, desirable growth habit, and excellent striking and ratooning put it in a different class to any of its predecessors.

Concurrently with this varietal development and of almost equal importance to the growers was the successful attainment of wireworm control. This serious pest has for many years caused incalculable losses in canefields and has been responsible for costly cultivation methods to improve drainage. The advent of "Gammexane" and its successful application in the solution of this problem are now well known. By the expenditure of a small sum on 20 lb. of "Gammexane" per acre at planting time freedom from damage by wireworms is assured.

The following table sets out the scope of the work carried out in the central division during the past year:—

TABLE OF FIELD EXPERIMENTS PLANTED AND HARVESTED IN THE MACKAY–PROSPERPINE AREA DURING 1948.

Type of trial.	No. planted.	No. harvested.
Fertility trials (lime)	..	18
Fertility trials (nitrogen)	..	19
Fertility trials (general)	1	4
Varietal trials (replicated)	4	15
Varietal propagation plots	..	25
Frost resistance trials	2	..
Legume trials	..	4
"Gammexane" trials (grubs)	..	7
"Gammexane" trials (wireworms)	..	34
" Chlordane " trial	..	1
Q.28 trouble trials	2	3
Mercurial trials	..	2
Locust defoliation trial	..	1
Fertility survey	1	..

The fertility, varietal and legume trial work is carried out for the same purposes as in the more northern areas, the aim being more intelligent fertilizing practice, even better varieties than at present and improvement in green manuring plants. Frost-resistance trials at Gargett test the resistance of promising new canes to low temperature conditions and ensure that very frost-susceptible varieties are not released for commercial planting in frost-affected areas. The Q.28 trouble plots are designed to give information on the cause of this mysterious affection, while the defoliation trial is expected to measure the effects of locust damage to growing cane. The results of all of these experiments will be discussed in separate articles.

Bundaberg and South.

In the southern division of the sugar belt "Gammexane" has not been of such value as in the other areas. Pest wireworms are not a problem in these areas and the restricted grub damage is caused by types of grubs which are not so easily controlled as the grey-back. Trials are still proceeding to elucidate the problem of control of these two-year-cycle types. The varietal trial work bulks largest in the Bundaberg and more southern areas. A variety revolution has taken place during the past two years in Bundaberg where C.P.29/116 has altered the picture to much the same extent as did Q.28 in Mackay. But the search goes on for canes which are earlier maturing, more frost resistant and better standover types than C.P.29/116. In varietal trials harvested in 1948 Q.50 has performed very creditably and Q.47 has maintained its previous promise of early sugar. In the table shown below it will be noted that, as in other areas, some emphasis was placed on lime and nitrogen trials, as these aspects of successful cane production require further elucidation.

TABLE OF FIELD EXPERIMENTS PLANTED AND HARVESTED IN THE SOUTHERN DISTRICTS DURING 1948.

Type of trial.	No. planted.	No. harvested.
Varietal trials	3	15
Yield observation trials	6	17
Propagation plots	82	..
Fertilizer trials (lime)	..	20
Fertilizer trials (nitrogen)	..	16
Fertilizer trials (general)	..	3
Legume trials	..	2
"Gammexane" trials	..	6
Mercurial trial	1	..
Fertility survey	1	..

The large number of varietal plots is a measure of the importance placed on this aspect of the field work and the above figures do not include the work on the Station itself. Considerable attention was paid during the year to the new legumes and complete confidence is maintained in the velvet-bean varieties for Bundaberg and Isis conditions. The recurring droughts of these areas make necessary a green manure crop which is more drought resistant than Poona pea and the experience to date is sufficient indication that velvet beans are the answer to this problem.

Land Drainage in the Moreton Area.

BY N. McD. SMITH.

WITH an average production of 24·0 tons per acre over an area of 5,000 acres the Moreton area rates second in Queensland in production figures. This figure, although contributed to largely by standover crops, is maintained by one factor more than any other—thorough land drainage.

Fifty years ago this requirement was well appreciated and 640 acres of the original settlement at Burnside were drained at an expense of 5s. per foot. As the demand for sugar increased it became necessary to push back from the reasonably well-drained banks of the permanent watercourses into the ill-drained billabong and tea-tree country. Normally these places were permanently watered, and almost at sea level, which necessitated extensive systems of open and sub-surface

FIG. 63.—Showing weed growth which normally occurs on the open type of drain. [*Photo. N. McD. Smith.*

drains. As a point of interest it may be stated that it is not unusual in the area for a farm of 24 acres gross assignment to be served by 1½ miles of open and subterranean drains. When it is realised that the current contract price would vary on the clay loams from 2s. 3d. to 2s. 9d. per foot for 3-inch tiles, it can be appreciated that such a system would be worth nearly a thousand pounds.

Unfortunately, farms are mostly small in area, and boundaries do not bear any relation to the topography. This means that systems sometimes fall short of the desired result because the outlet is improperly placed. It is also this fact which leads to high individual expense, as the conditions rarely lend themselves to group drainage. However, there are two large systems in the area which may be quoted as being major projects. The first embraces four main ditches constructed during the depression years in the West Coolum swamp. It is believed

that this scheme has directly benefited 500 acres of cane land and made available for grazing a corresponding area. The second project is near completion and is a co-operative effort to directly drain 820 acres of the South Maroochy swamp. In the first stages a 30-feet ditch a mile in length was constructed with a bulldozer, and it now remains for two miles of blasting through mud flats to complete the job.

In a normal soil the volume of air amounts to 25 per cent., and if this is reduced by waterlogging, harmful bacteria become active and undesirable chemical reactions take place, producing plant toxins which inhibit cane growth. The principle of drainage as applied to this area

FIG. 64.—Showing an open drain with a fall of 24 inches in 50 chains.
[*Photo. N. McD. Smith.*

is to maintain as near as possible the necessary aerobic conditions during maximum growth. As this period of maximum growth also corresponds with the period of heaviest rainfall it can be safely said that the local soil types cannot be drained too much. This fact applies equally to the hillside forest soils, where the trapping and leading away of soaks is the purpose of a drainage system. It must also be remembered that the passage of excess water through a sub-surface system creates a "suction" which circulates air through the soil, thus producing a suitable medium in which plant foods may become available.

DRAINAGE METHODS.

The drainage method employed depends on one, or a combination, of the following:—soil type, gradient, volume of water to be handled, availability of material and the economic factor of capital available. In the early days when good quality timber, such as bloodwood, grey gum or ironbark, was plentiful, sub-surface drains were mostly slabs. In recent years there has been a swingover to agricultural tiles, glazed pipes or concrete pipes because of permanence, ease of laying, and the availability of the article.

FIG. 65.—Illustrating a three-sided box drain with sides of sawn timber.

[*Photo. N. McD. Smith.*

Open Drains.

These are of two types—water furrows and ditches. Where the fall is slight it is usual to find both incorporated with a flood gate at the delivery point. On all systems, however, ditches are found as the main delivery, for a large volume of water has to be handled in a short time. Slabbing is not necessary, except where, to get the desired fall, the ditch has a sand bottom. In such cases slabbing up to the firm soil has been found satisfactory in the prevention of scouring, which would cause collapse of the sides.

Where water furrows are utilised they are spaced from eight rows to sometimes 20 rows apart and may have a sub-surface drain running below and parallel to their course. This variation in practice is due to the soil type, gradient, and length of row. For the stiff clays found on Eudlo Flat, Bli Bli and some parts of the lower Maroochy area eight-row spacing is practised, whilst on the sandy loams further upstream on the River up to twenty rows apart has proved satisfactory.

The principal disadvantage of the open type drains lies in their tendency to become weed nurseries. Growth of groundsel and reed grass slows down the flow, causing backing up of water with harmful results. They also constitute a nuisance in cultivation and much hand work is required each year to clear out weed growth and thus allow correct functioning.

FIG. 66.—A three-sided box drain discharging into the main drain. Note height of delivery point above usual water level.

[*Photo. N. McD. Smith.*

Underground Types.

Before filling in any of the types set out in the following it is necessary to cover the drains with brush, bark, grass, cane trash, or any other material which may be handy. This allows the soil to settle, or firm, and not trickle into the joins, thus stopping a free flow.

Stone Drains.

Where there is a plentiful supply of stones this material is sometimes used. In construction, a ditch is dug to the required depth, stones fitted roughly, and the whole covered in. This type has a limited life owing to the clogging of the crevices by plant roots and material held in loose suspension by the run-off waters.

Slab Drains.

Until about eight years ago this system was the most popular in use as suitable timbers were easily obtained and the labour supply was good. Under present conditions there has been a swingover to the agricultural pipes, which change is attributed to an economic factor relating to cost of and relative permanence of the respective materials. The scarcity of suitable timbers has also contributed to the alteration.

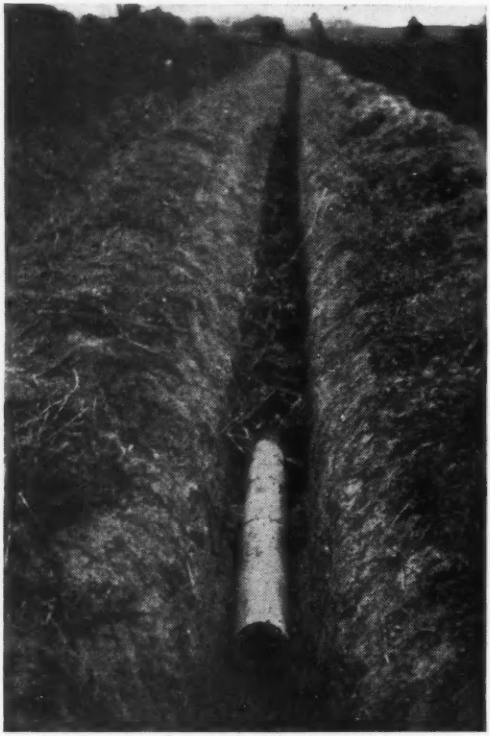

FIG. 67.—Tile drains in the process of being laid and covered over.
[*Photo. N. McD. Smith.*

The life of timber drains varies with the wood used, although as a general guide it may be said that, under moist conditions and provided the wood is laid when green, a life of 18 years may be expected. In the preparation of slabs a tool, known as a "throw" is used or, if this is not available, an ordinary plough knife coulter. There are four variations in slab drains, each one suiting different conditions, dependent on soil type, subsoil type, depth of top soil, nature of subsoil and degree of grade. Description of and notes on each are as follows—

(*a*) *Four-Sided Box.*—This type varies in size considerably, ranging from 12 x 12 inches to 4 x 4 feet in the square type, and from 4 x 14 inches to 2 x 3 feet in the rectangular type. Where a

volume of water is delivered under pressure, such as from a hillside, some growers have adopted the practice of reinforcing the inside with a four-sided brace. It is considered that this brace will slow the rush, prevent "boiling" and so avoid a "blow-up." Disadvantages exist in the upkeep, as braces rot quickly, causing general collapse of the system.

(*b*) *Three-Sided Box.*—This type can be used only where the subsoil is of a stiff clay nature. Sides may be of milled timber, slabbed timber, or tea-tree logs. With slabbed or sawn timber sides it is usual to peg at intervals and cut shoulders in the top slabs, which, when fitted, act as retainers.

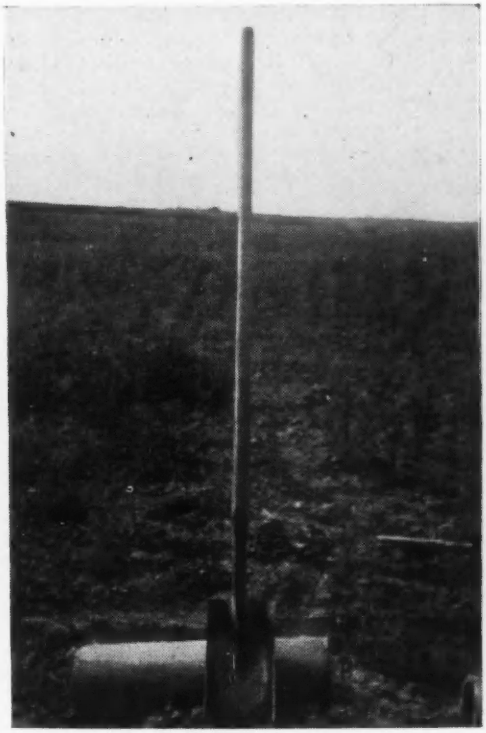

FIG. 68.—A posthole shovel cut down to a convenient size for digging a trench.
[*Photo. N. McD. Smith.*

(*c*) *One-Sided Drains.*—These also require a subsoil of clay. There is a slight variation within the type according to the shape of the trough, which may be either V-shaped or square-bottomed. In laying, the procedure adopted is to first dig a trench and then a narrower one to the required depth from the bottom of the larger. The top slabs are then placed across the small ditch, with ends resting on the shoulders. Of the two variations quoted the square-bottomed is favoured, since a cut-down shovel may be used to get the desired effect.

(*d*) *Logged Drains.*—Where there is a plentiful supply of suitably dimensioned tea-tree it has been the practice to lay saplings in a ditch. The trunks are cleared of bark, and two are laid slightly apart and

butt to top on the floor. The third log is placed on top, and through the spaces water may percolate freely. Theoretically the flow through this type would be very slow, yet in actual practice results cannot condemn it outright. A factor in favour of its adoption is the availability of material in the marsh country and the wet conditions prevailing, which ensure a life of at least 18 to 20 years.

The Mole Drainer.

This implement requires a stiff subsoil for optimum performance. It consists of a torpedo-shaped piercer attached to a shank which, as it passes through the soil, leaves a formed bore behind. A ball attached by a chain behind the penetrator seals the gash left by the shank. In using the implement the same procedure of following slopes as with other methods is adhered to, and the outlets are discharged into an open drain. Use of the implement has not met with major success in the area due to soil type variation within short distances.

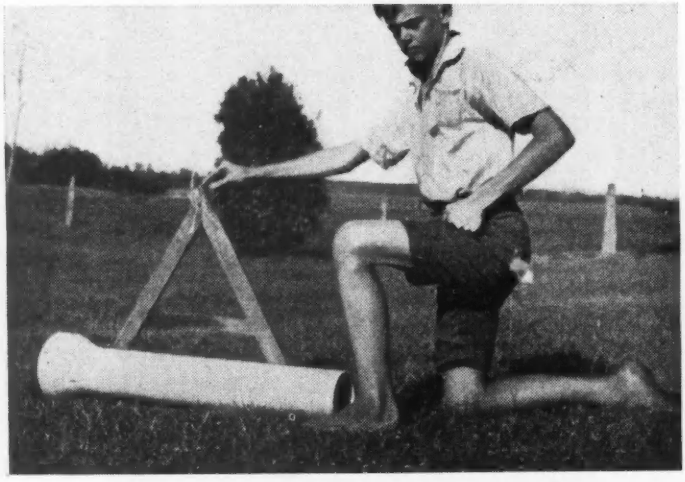

FIG. 69.—A home made leveller used on concrete pipes.
[*Photo. N. McD. Smith.*

PERMANENT SYSTEMS.

Agricultural Tiles.

Pipes, or more correctly, agricultural tiles, are available in lengths of up to two feet and in diameter from two inches upwards. Sometimes if unavailable, reject glazed or concrete pipes are utilised instead. To lay the pipes a trench is dug to the required depth following the fall of the land. The pipes are then laid end to end on the bottom of the trench and are adjusted until a reasonable fit is assured. To settle the tiles more firmly some growers use a cut-down post-hole shovel, which makes a three- to four-inch trough into which the pipes are placed. Before covering in, gravel, ashes, or grass "collars" are used to cover the joins. This prevents clogging until the soil has settled. A practice which is finding favour is to use clay for this purpose, covering the top half of the join only. This is sound practice as the entrance of water into a pipe is mainly through the bottom portion,

due to a pipe intercepting an upward vertical pressure resulting from the subterranean supply. The advantages of earthenware pipes lie in their ease of laying, the small amount of labour required to lay, and the ease with which the short lengths adapt themselves to various layouts.

LAYOUTS.

The main carriers are usually open ditches which can accommodate a free flow of water. In construction it is advisable where practicable to increase the grade considerably at the delivery point, as this ensures a maximum "draw." Patterns used for all types fall into three main categories which are combined to suit particular conditions. They are herringbone, grid, and staggered spacing. Conditions such as low

FIG. 70.—A "throw" in position for a slice, with a side and full face view of a slab.
[*Photo. N. McD. Smith.*

levels, slope of the ground and general layout of the farm may decide a pattern which is unique yet quite suitable. The herringbone and grid systems are self-explanatory and are used on large holdings where gradient is uniform. Staggered spacing is most usually found in the area, and consists of a main with feeders leading in at irregular intervals. These laterals run from low spots in the field and do not conform to any preconceived plan. This layout is adopted by force of circumstances, due to unevenness of the ground and the system of individual effort which ceases at respective boundaries.

The practice of having a subterranean main delivery drain is, in many cases, not considered worthwhile as, should a blockage occur, the whole system is thrown out of action. Leading back from the main delivery, tiles of four inches for secondaries and either three inches or two inches for branches are usual. There is no rule concerning the diameter of pipes as there are many factors governing uses, chief amongst these being availability, amount of water to be led off, and distances between tile lines. However, it is considered that four inches should be the minimum size as any subsidence still leaves a reasonable clearance at the pipe junction. At the junction of feeders and mains it must be remembered to allow an angle of 45 degrees as this assists

greatly in the "draw." With box drains the feeders should be laid at the same angle and should enter above the usual level of the water in the box drain.

To determine levels in laying it is the practice to start from the point to be drained and work towards the delivery point, watching the flow of water as it follows behind the operator. The use of boning rods is not general as growers find that a level and straight edge or three shovels in line are suitable substitutes. Distances apart of pipe lines vary according to the soil type. In clay loams it has been found that a system of five lines to four chains gives excellent service, whilst for the lighter sandy loams lines may be placed one chain apart.

As most of the main drains empty into a salt water course it is necessary to place a flood gate at the outlet. These contrivances require frequent inspections for it needs only a small piece of rubbish to prevent the hinged gate from closing allowing the water to pass both ways without hindrance. In construction it is important to lay the apron and wings at least six feet from the gate. This prevents mud crabs from burrowing behind the walls and thus reducing efficiency. Timber, unless suitably treated, will not last for aprons and wings, so that permanent material, such as concrete or fibro cement, must be utilised.

A centrifugal pump mounted on a flood gate is sometimes used to clear the accumulated water in the delivery ditch. This set-up is in the experimental stage and information to date suggests that a four-inch pump would suit requirements on an average-sized farm.

SUGGESTED IMPROVEMENTS TO EXISTING SYSTEMS.

The most obvious fault in schemes in operation is their restricted scope. Land subdivisions have cut the area into portions, the boundaries of which bear no relation to topography. Owners of these properties have installed systems to overcome individual problems but these, because of sealing down to suit small holdings, are inadequate.

In this respect it is thought that co-operation in the matter of laying a common subterranean delivery ditch would be a great mutual benefit. This point would, in many cases, straighten existing drains which, at the moment, are weed nurseries and a handicap in cultivation.

Flood gates are, in many cases, placed too close to the permanent watercourse and the benefits of an improved "draw" are greatly reduced.

Bound up with a good drainage system the value of lime as a corrective and soil opener must be appreciated. In this regard it must be pointed out that no benefits can be expected from liming without a thorough system of drains.

On performances to date the installing of centrifugal pumps is a great advantage, especially during the usual wet weather period. If these pumps can empty the water fast enough to prevent waterlogging the initial expense would be worthwhile and rapid in one season.

On slight gradients it is felt that three-inch or smaller pipes do not afford maximum efficiency. Under such conditions it is suggested that nothing less than a four-inch-diameter pipe be used for falls of at least two inches to the chain. Where it is desired that pipes be used on falls of less than two inches to a chain it is thought that six-inches pipes and over for three-quarter-inch to one-inch falls per chain would prove satisfactory.

Field Trials, 1948 Season.

By NORMAN J. KING.

THE normal field programme of the Bureau of Sugar Exeriment Stations was carried out during the past year and the results of many of the field trials harvested are given below. Owing to the extended 1948 harvesting season a good proportion of the experiments were necessarily harvested too late for inclusion in this Bulletin but these will be reviewed in the April number.

The sugar belt, as a whole, experienced an excellent year from the point of view of general growth conditions. All districts except the Lower Burdekin and Mackay experienced excellent rains and produced record or near record crops. In the Lower Burdekin the lack of a wet season was made up by extra attention to irrigation and the ultimate crops were up to standard, while in Mackay, where the rainfall was decidedly below average, its distribution was such as to ensure a surprisingly heavy crop. Under such conditions field trials produced good yields and the results can be accepted as an indication of the varietal performance under good conditions.

Mr. C. Buchanan's Farm, Mossman.

Soil Type.—Sandy loam. **Nature of Crop.**—Plant.
Age of Crop.—15 months. **Harvested.**—August, 1948.

SUMMARY OF CROP YIELDS.

Variety.	Cane per Acre.	C.C.S. in Cane.	Sugar per Acre.
	Tons.	Per cent.	Tons.
Badila	25·85	17·7	4·58
Badila Seedling	22·61	17·7	4·00
Q.44	**31·30**	15·5	**4·85**

DISCUSSION.

All varieties struck well after planting, the ultimate germination being between 95 and 100 per cent. The crop, planted in May, 1947, was fertilized in October with four cwt. per acre of planting mixture and this was followed by one bag per acre of sulphate of ammonia in November. The Badila Seedling was slower in germination than the other varieties and in the early months Badila made better growth than its competitors. By December Q.44 had developed a lead and this was retained throughout the remainder of the crop. At harvest Q.44 was shown to be five and a half tons per acre ahead of Badila, which was in turn over three tons above Badila Seedling. There was no difference between Badila and Badila Seedling in sugar content but both were over two units above Q.44. However in tons of sugar per acre Q.44 showed its superiority on this soil type and under the conditions obtaining Q.44 has proved a valuable variety in the Mossman area if grown on the soils for which it is best adapted.

Mr. T. Tolentini's Farm, Mossman.

Soil Type.—Granitic alluvial. **Nature of Crop.**—Second ratoon.
Age of Crop.—11 months. **Harvested.**—August, 1948.

SUMMARY OF CROP YIELDS.

Variety.	Plant Crop.		First Ratoon Crop.		Second Ratoon Crop.		Summary.	
	Cane per Acre.	C.C.S. in Cane.	Cane per Acre.	C.C.S. in Cane.	Cane per Acre.	C.C.S. in Cane.	Total Crop.	Total Sugar per Acre.
	Tons.	Per cent.	Tons.	Per cent.	Tons.	Per cent.	Tons.	Tons.
Eros ..	28·2	17·6	30·1	16·5	21·7	17·6	80·0	13·74
Trojan ..	28·7	16·2	17·2	15·7	10·8	15·5	56·7	9·27
P.O.J. 2878	23·5	15·7	25·6	14·3	14·3	17·7	63·4	9·57

DISCUSSION.

After the harvesting of the first ratoon crop conditions were rather dry and the block was ratooned by grubber. By early December the soil moisture was good and all varieties ratooned well, but Trojan was behind the other two. Eros forged ahead of the other canes and maintained its lead during the whole crop period, while Trojan failed to impress at any time. Eros has demonstrated its value on this soil type over the three crops of the experiment and in the aggregate has produced four and a half tons of sugar per acre in excess of the other two varieties.

DISPERSED VARIETAL TRIAL ON FARMS OF JARRATT BROS., A. WELSH AND H. C. POWELL.

Jarratt Bros., Eranchcombe, Mackay.

Soil Type.—Sandy alluvial. **Nature of Crop.**—Plant.
Age of Crop.—15 months. **Harvested.**—November, 1948.

SUMMARY OF CROP YIELDS.

Variety.	Cane per Acre.	C.C.S. in Cane.
	Tons.	Per cent.
Q.50	51·84	13·48*
Q.28	41·42	16·39
Q.45	43·58	17·11
P.O.J. 2878	39·35	16·58
Trojan	37·85	16·87
Q.44	32·49	13·88

* Red rot in the small mill sample reduced the sugar content of Q.50 in this trial.

A. Welsh, Mia Mia, Mackay.

Soil Type.—Sandy alluvial.
Age of Crop.—15 months.
Nature of Crop.—Plant.
Harvested.—November, 1948.

Variety.	Cane per Acre.	C.C.S. in Cane.
	Tons.	Per cent.
Q.50	**53·28**	**17·15**
Q.28	42·86	15·40
Q.45	42·40	16·34
P.O.J. 2878	46·24	16·64
Trojan	38·64	16·80
Q.44	33·77	15·12

H. C. Powell, Alexandra, Mackay.

Soil Type.—Sandy alluvial.
Age of Crop.—14 months.
Nature of Crop.—Plant.
Harvested.—October, 1948.

Variety.	Cane per Acre.	C.C.S. in Cane.
	Tons.	Per cent.
Q.50	24·01	16·32
Q.28	**26·92**	16·07
Q.45	24·29	17·28
P.O.J. 2878	23·73	17·22
Trojan	21·20	**18·03**
Q.44	20·26	16·83

SUMMARY OF RESULTS ON THREE FARMS.

Variety.	Average Cane per Acre.	Average Sugar per Acre.
	Tons.	Tons.
Q.50	**43·04**	**6·68**
Q.28	37·07	5·91
Q.45	36·76	6·20
P.O.J.2878	36·44	6·10
Trojan	32·56	5·57
Q.44	28·84	4·34

DISCUSSION.

The most striking feature of the above dispersed trial is the lower yield on Powell's farm. This was undoubtedly due to lack of fertilizer since all three farms are located on similar good alluvial country. Unfortunately the much lower production per acre on this one section of the trial influences

the analysis of results and brings about a reduction in average yield differences. For this reason the two other sections of the experiment have been examined separately with the following results:—

SUMMARY OF RESULTS ON TWO FARMS.

Variety.	Average Cane per Acre.	Average Sugar per Acre.
	Tons.	Tons.
Q.50	**52·56**	**8·06**
Q.45	42·99	7·20
P.O.J.2878	42·80	7·11
Q.28	42·14	6·70
Trojan	38·25	6·44
Q.44	33·13	4·81

Taking the results on two farms as best representing the conditions it is seen that Q.50 is significantly better than all other varieties in cane per acre, and Q.45, P.O.J.2878 and Q.28 were significantly superior to Trojan and Q.44. In terms of sugar per acre, Q.50 significantly exceeded Q.44 at the one per cent. level and all others exceeded Q.44 at the five per cent. level. Q.50 has now established itself as the major cane of the area and on general performance it will be difficult to displace.

Mr. J. C. Rasmussen's Farm, Sarina.

Soil Type.—Sandy loam. **Nature of Crop.**—Plant.
Age of Crop.—16 months. **Harvested.**—October, 1948.

SUMMARY OF CROP YIELDS.

Variety.	Cane per Acre.	C.C.S. in Cane.	Sugar per Acre.
	Tons.	Per cent.	Tons.
Q.50	**41·70**	18·56	**7·74**
A.130	36·30	17·26	6·26
Trojan	30·34	**18·69**	5·67
A.147	29·58	18·15	5·37
Q.28	27·33	18·15	4·96

DISCUSSION.

Planting conditions for this trial were very good and although Q.50 and Q.28 gave better germinations than the other varieties all gave stands of over 90 per cent. In the early stages A.130 and A.147 were outstanding with Q.50, Q.28 and Trojan following in that order. A growth check in early summer caused yellowing in Q.28 and A.130 but with midsummer rains all varieties forged ahead. The cover was best in Q.50, A.130 and Q.28 while A.147 was worst in this respect. All varieties except Trojan arrowed heavily and this allowed Trojan to make some late growth and reduce the leeway. The plant crop results demonstrated that Q.50 was significantly superior to all other varieties in the trial and A.130 was also significantly better than Trojan, A.147 and Q.28. In terms of sugar per acre Q.50 again exceeded all other varieties and A.130 was better than the remaining three.

DISPERSED VARIETAL TRIAL ON FARMS OF G. WHITTAKER AND APPS BROS.

Mr. G. Whittaker's Farm, Maroochy River.

Soil Type.—Alluvial loam. **Nature of Crop.**—First ratoon.
Age of Crop.—12 months. **Harvested.**—November, 1948.

SUMMARY OF CROP YIELDS.

Variety.	Plant Crop.		First Ratoon.		Summary.	
	Cane per Acre.	C.C.S. in Cane.	Cane per Acre.	C.C.S. in Cane.	Total Crop.	Total Sugar per Acre.
	Tons.	Per cent.	Tons.	Per cent.	Tons.	Tons.
C.P.29/116	**41·4**	14·4	**34·7**	12·9	**76·1**	**10·44**
Q.47 ..	39·9	14·5	32·2	14·2	72·1	10·36
Q.28 ..	36·8	14·9	28·7	**14·4**	65·5	9·61
Co.290 ..	40·1	12·2	27·8	10·5	67·9	7·81
P.O.J.2878	26·3	**15·2**	20·3	13·7	46·6	6·78

Messrs. Apps Bros.' Farm, Maroochy River.

Soil Type.—Alluvial loam. **Nature of Crop.**—First ratoon.
Age of Crop.—11 months. **Harvested.**—November, 1948.

SUMMARY OF CROP YIELDS.

Variety.	Plant Crop.		First Ratoon.		Summary.	
	Cane per Acre.	C.C.S. in Cane.	Cane per Acre.	C.C.S. in Cane.	Total Crop.	Total Sugar per Acre.
	Tons.	Per cent.	Tons.	Per cent.	Tons.	Tons.
C.P.29/116	**40·1**	**15·0**	**38·8**	13·3	**78·9**	**11·17**
Q.47 ..	37·0	14·6	35·1	15·3	72·1	10·77
Q.28 ..	39·3	15·0	34·1	14·8	73·4	10·95
Co.290 ..	34·1	11·7	30·4	10·6	64·5	7·21
P.O.J.2878	31·5	14·8	24·0	**15·5**	55·5	8·38

SUMMARY OF RESULTS ON TWO FARMS.

Variety.	Plant Crop.		First Ratoon.		Summary.	
	Cane per Acre (average).	C.C.S. in Cane (average).	Cane per Acre (average).	C.C.S. in Cane (average).	Total Cane (average).	Total Sugar per Acre (average).
	Tons.	Per Cent.	Tons.	Per Cent.	Tons.	Tons.
C.P.29/116	**40·7**	14·7	**36·7**	13·1	**77·4**	**10·8**
Q.47 ..	38·4	14·5	33·6	**14·7**	72·0	10·5
Q.28 ..	38·0	14·9	31·4	14·6	69·4	10·3
Co. 290 ..	37·1	11·9	29·1	10·5	66·2	7·5
P.O.J.2878	**28·9**	**15·0**	22·1	14·6	51·0	7·6

DISCUSSION.

In these two one-year trials C.P. 29/116 yielded the heaviest average crop in the aggregate but the higher sugar content of Q.47 made it nearly as high in sugar per acre. Q.28 was a close third and Co.290 and P.O.J.2878 were easily outyielded. Q.47 is coming into strong favour in this area and since it is not so heavy an arrower as C.P.29/116 it will probably displace a lot of the latter where it is desired to stand crops over

Messrs. Kendall Bros.' Farm, Branyan Road, Bundaberg.

Soil Type.—Red sandy loam. **Nature of Crop.**—Plant.

Age of Crop.—13 months. **Harvested.**—November, 1948.

SUMMARY OF CROP YIELDS.

Variety.	Cane per Acre.	C.C.S. in Cane.	Sugar per Acre.
	Tons.	Per cent.	Tons.
C.P.29/116	**30·12**	16·47	**4·96**
Q.28	29·03	16·08	4·67
Q.47	27·26	16·45	4·48
M.1900 Seedling	19·87	**17·37**	3·45

DISCUSSION.

This varietal trial was designed to investigate the value of M.1900 on these lands when compared with more recent varieties. This particular soil type was considered the home of M.1900 prior to its elimination from the approved list because of gumming and Fiji disease but its performance in this trial in a very good year only serves to indicate that the more modern canes are superior in yielding capacity. C.P.29/116 significantly exceeded all other varieties in the trial and all other varieties were superior to M.1900. In terms of sugar per acre M.1900 was also significantly inferior to the other varieties. Attempts have been made in other southern districts to reintroduce M.1900 but in no case has it succeeded in competing with present-day standards.

PLANTING MATERIAL TRIAL.

Mossman Rural School, Mossman.

Soil Type.—Brown loam. **Nature of Crop.**—Plant.

Age of Crop.—14 months. **Harvested.**—July, 1948.

Variety.—Q.44.

SUMMARY OF CROP YIELDS.

Source of Plants.	Cane per Acre.	No. of Misses supplied per Plot.
	Tons.	
Schist soil	50·08	37
Alluvial soil (good plants)	49·06	33
Alluvial soil (poor plants)	47·22	68
Black forest soil	46·70	65

DISCUSSION.

The question of type of planting material to be used is one which is normally given serious consideration by all farmers and the above experiment was designed to illustrate to Mossman Rural School students just what result might be expected by utilization of plants from different sources. The yields

indicated an advantage in favour of the schist soil plants but the errors of the experiment were such that this can be treated only as a suggestion. Germination figures favoured the schist soil plants and also the good plants from alluvial soil but the differences in strike were not significant. Similar experiments have been carried out in various districts from time to time but in no case has any decided advantage been obtained by using plants from any particular source. Planting conditions appear to be much more important than plant quality in the securing of a good stand.

CULTIVATION TRIAL.

Mr. J. Skidmore's Farm, Gordonvale.

Soil Type.—Red-brown loam. **Nature of Crop.**—Plant.

Age of Crop.—15 months. **Harvested.**—August, 1948.

SUMMARY OF CROP YIELDS.

Treatment.	Cane per Acre.
	Tons.
Young cane grubbed in October	24·39
No grubbing	25·60

DISCUSSION.

This trial, which consisted of four grubbed strips through the field and four ungrubbed strips, was laid down to investigate the benefits claimed for grubbing the interspaces in young plant cane. Prior to planting the field received three ploughings but no other treatment. Trojan was planted and a germination approximating to 90 per cent. was obtained. At no stage of development did the grubbing appear to have had any beneficial or detrimental effect and it can only be stated that the time spent on this operation was wasted. A considerable amount of investigation of cultivation practices is necessary in the sugar industry but difficulty is encountered in obtaining the co-operation of growers in this form of experiment.

PERMANENT TRASH TRIAL.

Sugar Experiment Station, Bundaberg.

Soil Type.—Red volcanic loam. **Nature of Crop.**—Plant.

Age of Crop.—18 months. **Harvested.**—September, 1948.

SUMMARY OF CROP YIELDS.

Treatment.	Cane per Acre.	C.C.S. in Cane.
	Tons.	Per cent.
Trash	42·1	15·41
No trash	44·9	15·33

DISCUSSION.

This trial has now been in existence since 1932. The block is divided into four parts on two of which all crops are cut green, the trash and tops conserved in alternate interspaces and all residues ploughed in after the second ratoons. On the other two sections all trash and tops are burnt. The entire block receives uniform treatment of fertilizers and of green manures. To date no significant differences in crop have been obtained but the experiment will be continued as a permanent trial. The only conclusion to be drawn is that, on this soil type, trash conservation does not pay dividends. There is no evidence however that this would apply to other soil types with less favourable characteristics.

VARIETAL TRIAL.

Mackay Sugar Experiment Station.

Soil Type.—Sandy to silty loam. **Nature of Crop.**—First ratoon.
Age of Crop.—12½ months. **Harvested.**—November, 1948.

SUMMARY OF CROP YIELDS.

Variety.	Plant Crop.		First Ratoon.		Summary.	
	Cane per Acre.	C.C.S. in Cane.	Cane per Acre.	C.C.S. in Cane.	Total Crop.	Total Sugar per Acre.
	Tons.	Per cent.	Tons.	Per cent.	Tons.	Tons.
Q.50 ..	**19·11**	**18·70**	**35·33**	**17·94**	**54·44**	**9·92**
Q.28 ..	15·49	18·13	28·97	16·77	44·46	7·73
B.174 ..	15·12	18·27	27·93	17·41	43·05	7·62
P.O.J.2878	12·81	17·50	24·43	16·89	37·24	6·36
Trojan ..	7·57	17·68	13·61	17·54	21·18	3·72

DISCUSSION.

After harvesting the plant crop the block was ratooned by grubbing after a disc harrowing had been given. The block was fertilized with two bags per acre of Sugar Bureau No. 1 Mixture and top-dressed with two separate bags per acre of sulphate of ammonia in December and January. All varieties ratooned well but Q.50 established an early lead while Trojan was not impressive at any stage. The results at harvest confirm the plant crop figures and Q.50 demonstrated in no uncertain manner its superiority over other varieties in the trial; it significantly exceeded all others while the first four canes were significantly superior to Trojan in both cane and sugar per acre.

Apply Fertilizers Early!

We have always advocated that applications of mixed manures to plant cane should be placed in the drill—for preference, just below the cane setts. This assures the earliest possible supply of phosphate and potash to the young cane, and is especially important on lands highly deficient in these plantfoods.

If Sugar Bureau mixtures are employed, the amount of nitrogen added is insignificant. This is planned deliberately, for if the farmer has green manured the land during the fallow, ample nitrogen should subsequently be available for the full needs of the plant cane.

There are, however, certain circumstances in which these planting mixtures might be improved upon: (1) on land which is known to be highly deficient in nitrogen (that is, where sulphate of ammonia gives good results even with plant cane), and where no green crop has been grown; or (2) in every case where, for one reason or another, the farmer finds it necessary to "plough-out" and "replant." An early nitrogen deficiency may be so acute in these circumstances that the development of the plant cane may be seriously retarded, unless more nitrogen is applied in the planting drill.

Under such conditions, the use of Sugar Bureau ratooning, rather than planting, mixtures is advised; or, alternatively, the application of a mixture rich in meatworks manure may be substituted. Such treatments have proven particularly valuable in the Lower Burdekin district, where the application of nitrogenous fertilizers is the only plantfood treatment which gives consistently beneficial results.

N.J.K.

Fertilizer Distributor.

BY G. BATES.

THE method of fertilizing ratoon cane varies from district to district; in many cases the fertilizer is applied as a separate operation, whilst in others it is applied at the same time as some other work, such as grubbing or ratooning.

FIG. 71.—Illustrating the distributor in the raised position.

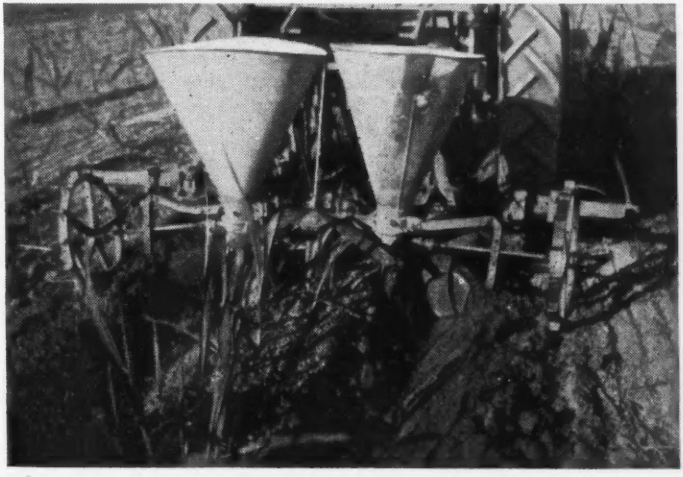

FIG. 72.—The fertilizer distributor at work.

Of interest to growers whose method of ratooning is to plough away with a ratooning plough, is the attachment used by E. L. Rossi & Son of Mossman. Attached to the A.V. Farmall tractor is a frame which carries the right and left ratooning ploughs and two standard Hodge fertilizer machines Thus the ratooning and fertilizing is done in one operation.

The attachment is very simple and can be put together by any farmer. It can be taken off or attached to the tractor in a matter of minutes. The frame is U-shaped and is constructed from 2 x 1-inch steel. The arms are 36 inches long and 26½ inches apart. To each corner of this frame, held in position by U-bolts is a standard Hodge fertilizer machine, similar to those on the Hodge planter, together with the right and left ratooning ploughs.

It is not absolutely necessary to have the two fertilizer machines, as it has been proved beyond doubt that fertilizer applied on one side of the stool, gives the same result as half the amount applied on two sides. The two machines however, are an advantage where fertilizer application rate is high and the drills long, as it obviates the necessity of having fertilizer dumps on each end of the paddock.

The photographs give a clear picture of the attachment in operation.

Mercurial Fungicides are Poisonous.

By J. H. BUZACOTT.

MERCURIAL fungicides (see Quarterly Bulletin, October, 1948, p. 54) have been used for some time in various parts of Queensland for treating setts when plantings have to be made under adverse conditions. Results have well warranted the little extra time and expense involved. The fungicides are poisonous of course and, like other compounds containing mercury, can cause reactions in people with a sensitive skin. With normal care the dilute solutions used, however, are not likely to lead to symptoms in anyone and many hundreds of bags of plants have been treated by farmers and Bureau officers without any effects whatsoever.

The familiarity which breeds contempt can be a menace when handling dangerous things; motor-car accidents and electrocutions are obvious illustrations of this, and it is not surprising that carelessness should cause some trouble with the mercurials. In the case recently brought to our notice in the North, the operator was using one of the less soluble mercury powders which have to be made into a paste before they will mix properly with the full bulk of water. Instead of making the paste with a stick, or some similar implement, he mixed it with his hands and the nasty blisters shown in the accompanying photograph were the result. They were very painful while they lasted, and in addition could have allowed the absorption of a considerable amount of mercury, with subsequent ill-effects on other parts of the body. The blisters responded readily to Gentian Violet and a dry dressing, and the victim of his own carelessness is under observation as to any other symptoms which may develop.

FIG. 73.—Note the blisters between the fingers caused by a concentrated solution of a mercurial fungicide.

Careless handling of these mercurials directly from the tin, or in concentrated solutions, can be dangerous, but because one operator suffered from carelessness is no reason whatsoever for any suggestion that the use of mercurials should be discouraged. After all, many substances used about the farm, from kerosene and petrol to rat baits, can be dangerous to human life, but this fact does not prevent their being used with advantage for their proper purposes.

Fiji Disease in the Maryborough District.

BY NORMAN J. KING.

Historical Record.

THE first occurrence of Fiji disease recorded in Queensland was during the course of a disease survey by Bureau pathologists during 1926. In that year the disease was found to be well established in Maryborough and Beenleigh, but the absence of records of plant introductions by farmers made it impossible to determine just when the original outbreak occurred. It was considered by the pathologists at that time, as the result of conversations with many growers and their recollections of the symptoms, that Fiji disease had probably been there for ten years. A survey of the area in 1926 disclosed that the disease existed on both banks of Tinana Creek from Bidwell School to the Mary River, down the Mary River to below Point Lookout, and up to a point three miles above Lamington Bridge; isolated cases were found at Walker's Point, Welcome Creek and Mungar, and on the Gympie road. The only finding away from the river-flat country was at Melrose.

The control measures recommended at that time were the use of clean plants from Pialba and other parts of the area, the roguing of fields with less than five per cent. infection, the ploughing out, after harvesting, of fields with heavier infestation, and the use of the more resistant varieties, Q.813, H.Q.285 and Petite Senneville. In addition, legislative measures were introduced by proclamation which prohibited the introduction of cane plants from New South Wales and also the removal of any cane plants from the counties of Ward, Stanley, Canning and March. The first of these measures was aimed at prevention of further introductions of diseased material to any part of Queensland, and the second was an attempt at limiting the disease to the infected areas then known. However, a year later Fiji was found to be present in the Bundaberg and Moreton districts, the diseased cane in these instances having been introduced from New South Wales prior to the gazettal of the aforementioned proclamations.

Despite these recommended precautions for dealing with the disease, rapid spread continued in the Maryborough and adjacent areas. A survey completed in 1937 disclosed that the Island Plantation, Saltwater Creek, Walker's Point, Granville and the Pocket were heavily infected and that traces of Fiji existed at Tinana, Nerada, Glenorchy, Melrose, Teddington, Iindah, Gympie Road, Yerra, Chappell Road and Bidwell. Later in the same year the disease was found at Prawle, Graham's Creek and Tiaro. Fiji disease was recorded about the same period at Nikenbah, Dundowran, Urangan, Takura, Pilerwa, Yengarie, Antigua, Owanyilla, Blackmount, Kooringa and Bauple. As a result of the inspection of 189 farms in these areas the following percentages of Fiji disease in the fields examined were found:—

Infection percentage	Nil	trace	0.5–1	1–2	2–5	5–10	over 10
Number of farms	120	32	9	8	5	6	9

Since an infection of 10 per cent. represents 500 to 600 diseased stools per acre, the magnitude of the task of attempting control can be appreciated. The badly infected parts of the Maryborough district had

* Paper presented at the Maryborough Conference, Q.S.S.C.T., April, 1948.

already reached the stage where control by roguing and the use of clean plants was impracticable, and the only hope of survival was in the use of resistant varieties. At that time the favoured varieties in the badly diseased sections of the area were M.1900 Seedling and D.1135, both susceptible to Fiji disease, while the more resistant Q.813, H.Q.285 and Petite Senneville were grown to only a small extent. Since none of these three canes was outstanding in productive capacity the possibility of introducing other, Fiji-resistant varieties was explored. Co.290, P.O.J.2878 and P.O.J.2725 were at that time assuming prominence in the southern areas, but only one of these, Co.290, was found to be resistant to the disease. Despite the excellent production record of the two P.O.J. canes, their planting was not permitted in the diseased areas in Maryborough as they were even more susceptible than the existing varieties. For several years Co.290, Q.813 and H.Q.285 then became the major canes of these areas. None was entirely suited to the one-year cropping cycle of the areas; Co.290 had low c.c.s. and the others were poor producers, but Fiji disease was already on the wane.

Table I shows the numbers of diseased stools found and destroyed from July, 1939, to June, 1947, in the principal diseased areas.

TABLE I.

Year.	Island Plantation, Walker's Point, Granville Pocket.	Bauple, Tiaro.	Yerra, Antigua, Pilerwa.	Bidwell, Tinana.	Pialba, Takura.	Total.
1939-40	1,482	63	510	2,985	284	5,324
1940-41	3,166	64	206	787	230	4,453
1941-42	434	61	91	9	246	841
1942-43	135	2	15	39	202	393
1943-44	2	2	8	6	86	104
1944-45	2	2	2	1	71	78
1945-46	1	0	1	1	81	84
1946-47	19	0	0	3	7	29

Actually the 1939-40 figures for the Island Plantation division do not appear as bad as they really were. The 1,482 stools destroyed were on only 15 acres and no further inspections were made for the year as the majority of the badly infected fields were being ploughed out. With the elimination of M.1900 Seedling and D 1135 and the growing of only Co.290, Q.813, H.Q.285 and Oramboo, a remarkable decrease in disease incidence became apparent, and from being the most heavily Fiji-disease infected area in Queensland the Island Plantation by 1943 was free of the disease. No infected stools have been found since that time.

By the middle of 1947 it appeared that a complete clean-up of Fiji disease had been made in the Island Plantation, Granville, Saltwater Creek, Prawle and the Pocket, while only one finding of Fiji had been made in the previous year at Tinana and Walker's Point. The entire Bauple and Tiaro areas are apparently free, as the last disease found there was during 1944, while at Bidwell and Magnolia the disease seems to have been completely eradicated and none has been located since 1941. In Yerra and Antiiua no stools have been seen since 1946, but in the Pialba-Nikenbah-Urraween-Takura area the position is not so favourable.

It will be seen in the above table that in 1939-40, the first year of systematic inspections, 284 diseased stools were found in this area. In the succeeding three years no great improvement was apparent, over 200 stools being found each year. The susceptible varieties, P.O.J.2878 and Q.25, were being widely grown and practically all of the disease occurred in these plantings. It was obvious that action would have to be taken to tighten up on the use of plants from diseased fields, and in 1944 a proclamation was issued, the effect of which was to quarantine all farms in the Pialba area and to prohibit the use by any farmer of his own cane plants except by permission of an inspector. The result of this restriction was immediate and the disease findings decreased to under 100 stools in the next three years and to the low figure of seven in 1946-47. The elimination of Q.25 from the approved variety list was another factor contributing to the lower findings in the last year. However, planting restrictions, aided by systematic inspections and roguing, are not the only factors contributing to the small number of diseased stools found in 1946-47. The severe drought doubtless had a good effect in killing off weak and unthrifty stools, and it also caused a larger plough-out programme than usual. Many diseased fields were thus destroyed which, in a better year, may have been ratooned and served as centres of infection for further spread.

It may be stated that, in the badly diseased areas contiguous to Maryborough, control was brought about principally by legislative action in prohibiting the growing of susceptible varieties, while in the more distant Pialba and Bauple districts the mastery of the disease, when complete, will have been attained by a combination of roguing, ploughing out of bad fields, control of plants and the effects of dry seasons.

The elimination of susceptible varieties by legislation is obviously the most successful and expeditious method, as evidenced by the freedom from disease of the Island Plantation, Granville, &c., which were originally the worst areas. This method is admittedly a drastic one, particularly when the susceptible varieties are the most profitable ones to the grower. On the other hand, the speed of control of the disease by this method allows of reintroduction of the susceptible types after a short period when the risk of reinfection is considered to be slight. This has already been done on the Island Plantation where the old favourite, M.1900 Seedling, was planted in restricted acreages some three years ago.

Varietal Changes.

Since the time when Fiji disease was first recognized as a major disease problem at Maryborough, the varietal picture has altered considerably. As mentioned earlier, M.1900 Seedling and D.1135 were then the major varieties. P.O.J.213 was introduced to the area in the early thirties but never gained marked popularity, although it was highly resistant to Fiji disease. By 1942 it represented eight per cent. of the total crop and then gradually fell to only one per cent. in 1946. C.O.290 attained considerable prominence by reason of its hardiness on poorer lands and its resistance to Fiji disease, and it became the major variety in the badly diseased districts. By 1942 it represented over forty per cent. of the crop crushed at Maryborough mill, but the percentage has dropped to half that figure since. P.O.J.2878, which appeared a couple of years before Co.290, was not approved for planting in the Maryborough area, although the Pialba district, then supplying Isis Central mill, was permitted to grow it. The high susceptibility of this variety to Fiji disease

would have undoubtedly accentuated the position of the Maryborough growers and made the problem of disease control much more difficult. It was not until 1943 that P.O.J.2878 was approved for planting, and then only on farms south of Mungar. In 1944 this restriction was amended to allow of planting in all parts of the Maryborough mill area except Island Plantation, Walker's Point and Granville.

The advent of Q.25, the first of the Bureau seedlings to be distributed in south Queensland, did not improve the position since it also was very susceptible to Fiji disease, and could not be approved in the affected areas. In 1942 the Fiji-resistant Q.42 was planted on the Island Plantation and attained immediate popularity on account of its excellent growth under those conditions, its high sugar content and its frost resistance. By 1945, Q.42 was being widely grown on all the alluvial flats of the Mary River, and two years later this variety represented 16.3 per cent. of the Maryborough mill crushing. The varieties Q.28, Q.47, Q.48, Q.49, Q.51, Q.52 and C.P.29/116 were all introduced during recent years. All have reasonable commercial resistance to Fiji disease, but only C.P.29/116 and Q.28 have yet been placed on the approved list. Q.48, Q.51 and Q.52 are unsatisfactory in certain respects, but Q.47 and Q.49 are being rapidly propagated for distribution.

The overall varietal change since 1935 has been very marked. In that year M.1900 Seedling, D.1135, Q.813 and H.Q.285 represented 88.3 per cent. of the Maryborough crop, but in 1946 D.1135 and H.Q.285 had disappeared, while M.1900 Seedling (once more approved) and Q.813 totalled only 5.4 per cent. of the crop. P.O.J. 2878 constitutes over 44 per cent. and Co.290 over 21 per cent., while Q.42 is the third variety in order of importance. Although nearly half the crop is obtained from the susceptible P.O.J.2878, the incidence of Fiji disease is now so reduced that it no longer constitutes a threat to the industry. Ordinary care in plant selection, combined with the continuation of farm inspections, will ensure that the epidemic does not recur. The cane-breeding programme of the Bureau and the concurrent disease-resistance trials of the more promising seedlings ensure a steady stream of new, disease-resistant varieties which will eventually replace any disease-susceptible canes now being grown.

In retrospect we can view the period 1927 to 1945 as a critical one in the history of the Maryborough sugar industry. Twenty years ago even the most optimistic did not visualize a district free of major diseases, but this day is now in sight. A reduction in diseased stools found from 5,324 in 1939-40 to a mere 29 in 1946-47 is a remarkable feat of control and a record of which the Cane Pest and Disease Control Board might well be proud. But it is desirable to sound a note of warning. The fact that the disease has been reduced to such low proportions should not be an excuse for complacency. Three very susceptible varieties are still being grown in the area and rapid spread of the disease is still possible if control measures are not carefully continued. The cost of the operations of the Cane Pest and Disease Control Board (1½d. per ton of cane to the grower) is a very cheap insurance, and should be considered as such even if no disease were being found. The frequent and systematic inspections ensure that no disease can assume serious proportions before being located and identified and control measures instituted.

Bureau of Sugar Experiment Stations,
Brisbane.

Experiment Station Field Days.

According to usual practice, field days will be held at all three Sugar Experiment Stations during the coming year. Although it is yet too early to finalise dates for these functions it is known that the field day at the Mackay Experiment Station will be held during the period of the Conference of the Queensland Society of Sugar Cane Technologists, which is anticipated to begin on 29th March. It was considered desirable to give early publicity to this fact so that not only the Mackay and district growers, but also intending agricultural delegates to the Conference, would be advised in time of the fact that the field day would be held.

In conformity with past practice, growers and other interested persons attending the field day will be taken around the station in small groups by members of the staff and will be able to inspect all experiments which are being carried out. These field inspections will be made during the morning, after which a light luncheon will be served. During the afternoon some short informative addresses will be given to the gathering, and demonstrations of cultivation implements will be arranged. At the last field day at Mackay in May, 1948, approximately 450 district growers, millers, and other interested persons availed themselves of the opportunity to spend the day at the Experiment Station, and it was obvious that this centre of the Bureau activities in the Mackay district held much of interest to the local and visiting sugar producers. It is confidently anticipated that there will be no slackening of this interest at the 1949 field day.

—*N.J.K.*

"Gammexane" Supplies for Pest Boards.

Some Cane Pest and Disease Control Boards experienced difficulties in getting the whole of their 1948 "Gammexane" orders delivered in time to allow the application of this insecticide to the canefields prior to the beetle flight, which took place in most districts round about the second half of December. This was due partly to shortage of manufacturing plant, raw materials, labour, and difficulties in transport. However, it was felt, in some cases, that a certain amount of trouble could have been avoided had Boards placed firm orders at the outset, rather than, as did actually happen, forward, from time to time, orders that had been substantially amended in each instance. Had this been done it would have allowed production and deliveries to have proceeded on a better organised basis.

As a result of last year's experience, Boards will appreciate the disabilities that have been met with not only in manufacturing but in finding shipping opportunities for deliveries at northern ports, and in order to circumvent the difficulties previously encountered the manufacturers plan to proceed with the production of the 1949 "Gammexane" requirements right from the commencement of the New Year. It is hoped, in this way, that supplies will be able to be sent forward to any Boards that are prepared to take delivery at any time. This will ensure

that those Boards which are prepared to co-operate along these lines will be in possession of their quotas in ample time to permit the insecticide being applied during the correct and most convenient period.

Therefore, in the event of any Board requiring a quantity of "Gammexane" No. 10 dust for the 1949 season the manufacturers have requested that, in order to facilitate deliveries, they or their agents should be advised, as soon as possible, regarding the following points:—

1. The amount of the Board's firm order for No. 10 "Gammexane" dust for the whole of 1949;
2. The Board's acceptance of the suggestion that any part of its order be shipped at any time from January onwards;
3. The latest date at which the Board will accept delivery in North Queensland;
4. The name of the Board's transhipping agents, and the port at which it is desired shipments should be made.

Individual growers can contribute largely to the success of this scheme by submitting immediately to their respective Cane Pest and Disease Control Boards their firm orders for their 1949 "Gammexane" requirements. This product does not deteriorate when stored, so a grower takes no undue risk if he orders his full anticipated requirements.

—*R.W.M.*

Orders for Rat Baits.

Even taking into consideration the difficult war years, the manufacturers of the packeted wheat type of rat baits are now passing through one of the most trying periods experienced in their efforts to provide for the full requirements of various Cane Pest and Disease Control Boards in respect of these poison baits.

Not only is additional labour for this class of work most difficult to secure, but shortage of packets has even entailed the air-freighting of supplies from South in an effort to prevent interruption of production. In addition, both thallium sulphate and zinc phosphide must be imported, and long delays in the deliveries of these poisons are possibilities which cannot be overlooked. Hence the manufacturers are in no position to accept orders for delivery of large quantities of rat baits at short notice. It is appreciated that rat populations vary tremendously from year to year, and in consequence it is only to be expected that the total quantity of baits ordered from year to year by any one Board must vary considerably. However, it would facilitate the planning of production (and production must be planned when essentials are in short supply) if all Boards would indicate as early as possible their rat bait requirements for the twelve-month period, and place their orders with the manufacturers accordingly. By so doing this will ensure each Board receiving its due proportion of the current year's production.—*R.W.M.*

"THE SUGAR EXPERIMENT STATIONS ACTS, 1900 TO 1948."

List of Varieties of Sugar Cane Approved for Planting in 1949.

Department of Agriculture and Stock,
Brisbane, 1st January, 1949.

Mossman Mill Area.

Badila, Cato, Clark's Seedling, Comus, D.1135, H.Q.409, Korpi, P.O.J.2878, Pompey, Q.10, Q.44, S.J.4, and Trojan.

Hambledon Mill Area.

Badila, Badila Seedling, Cato, Comus, D.1135. Eros, Pindar, Pompey, Q.44, and Trojan.

Mulgrave Mill Area.

North of Fig Tree Creek.

Badila, Badila Seedling, B.147, Cato, Comus, D.1135, Eros, P.O.J.2878, Q.10, Q.44, Q.50, and Trojan.

Babinda District.

Badila, Badila Seedling, B.147, Cato, Clark's Seedling, Comus, D.1135, Eros, Q.10, Q.44, and Trojan.

South of Russell River.

Badila, Badila Seedling, Clark's Seedling, Eros, Q.10, Q.44, S.J.4, and Trojan.

Babinda Mill Area.

Badila, Badila Seedling, B.147, Cato, Clark's Seedling, Comus, D.1135, Eros, Q.10, Q.44, and Trojan.

Goondi Mill Area.

Badila, Badila Seedling, Clark's Seedling, Eros, Pindar, Pompey, Q.10, Q.44, S.J.4, and Trojan.

South Johnstone Mill Area.

Badila, Badila Seedling, Clark's Seedling, Eros, Q.10, Q.44, S.J.4, and Trojan.

Mourilyan Mill Area.

Badila, Badila Seedling, Clark's Seedling, Eros, Pompey, Q.2, Q.10, Q.44, S.J.4, and Trojan.

Tully Mill Area.

Badila, Badila Seedling, Clark's Seedling, Eros, Q.2, Q.10, Q.44, Q.813, and Trojan.

Victoria Mill Area.

Badila, Cato, Endor, Eros, H.Q.409, Orion, Pindar, P.O.J.2878, and Trojan.

Macnade Mill Area.

Badila, Cato, Endor, Eros, H.Q.409, Orion, Pindar, P.O.J.2878, and Trojan.

Invicta Mill Area.

North of Townsville.

Badila, Comus, Eros, H.Q.409, P.O.J.2725, Q.10, S.J.2, and Trojan. The variety Clark's Seedling may be planted only in the section south of Cattle Creek.

South of Townsville.

Badila, B.208, Clark's Seedling, Comus, E.K.28, P.O.J.2714, S.J.2, S.J.4, S.J.16, and Trojan.

Pioneer Mill Area.

Badila, B.208, Clark's Seedling, Comus, E.K.28, P.O.J.2878, S.J.2, S.J.16, and Trojan.

Kalamia Mill Area.

Badila, B.208, Clark's Seedling, Comus, E.K.28, P.O.J.2878, S.J.2, S.J.4, S.J.16, and Trojan.

Inkerman Mill Area.

Badila, B.208, Clark's Seedling, Comus, E.K.28, P.O.J.2878, S.J.2, S.J.4, S.J.16, and Trojan.

Proserpine Mill Area.

Badila, Clark's Seedling, Co.290, Comus, E.K.28, M.1900 Seedling, P.O.J.2878, Q.28, Q.45, Q.50, Q.813, S.J.2, and Trojan.

Cattle Creek Mill Area.

Badila, Badila Seedling, Clark's Seedling, Co.290, Comus, D.1135, E.K.28, M.1900 Seedling, P.O.J.2725, P.O.J.2878, Q.28, Q.45, Q.50, S.J.2, and Trojan.

Racecourse Mill Area.

Badila, Badila Seedling, Clark's Seedling, Co.290, Comus, D.1135, E.K.28, M.1900 Seedling, P.O.J.2725, P.O.J.2878, Q.28, Q.45, Q.50, Q.813, S.J.2, and Trojan.

Farleigh Mill Area.

Badila, Badila Seedling, Clark's Seedling, Co.290, Comus, D.1135, E.K.28, M.1900 Seedling, P.O.J.2725, P.O.J.2878, Q.28, Q.45, Q.50, S.J.2, and Trojan.

North Eton Mill Area.

Badila, Badila Seedling, Clark's Seedling, Co.290, Comus, D.1135, E.K.28, H.Q.285, M.1900 Seedling, P.O.J.2725, P.O.J.2878, Q.28, Q.45, Q.50, Q.813, S.J.2, and Trojan.

Marian Mill Area.

Badila, Badila Seedling, Clark's Seedling, Co.290, Comus, D.1135, E.K.28, M.1900 Seedling, P.O.J.2725, P.O.J.2878, Q.28, Q.45, Q.50, S.J.2, and Trojan.

Pleystowe Mill Area.

Badila, Badila Seedling, Clark's Seedling, Co.290, Comus, D.1135, E.K.28, M.1900 Seedling, P.O.J.2725, P.O.J.2878, Q.28, Q.45, Q.50, Q.813, S.J.2, and Trojan.

Plane Creek Mill Area.

Badila, Badila Seedling, Clark's Seedling, Co.290, Comus, D.1135, E.K.28, M.1900 Seedling, P.O.J.2714, P.O.J.2725, P.O.J.2878, Q.28, Q.45, Q.50, Q.813, S.J.2, and Trojan.

Qunaba Mill Area.

C.P.29/116, Co.290, P.O.J.213, P.O.J.2878, Q.25, Q.28, Q.42, Q.47, Q.48, and Q.49.

Millaquin Mill Area.

C.P.29/116, Co.290, P.O.J.213, P.O.J.2878, Q.25, Q.28, Q.42, Q.47, Q.48, and Q.49.

Bingera Mill Area.

Atlas, C.P.29/116, Co.290, Mahona, P.O.J.2725, P.O.J.2878, Q.25, Q.28, Q.42, Q.47, Q.48, and Q.49.

Fairymead Mill Area.

C.P.29/116, Co.290, P.O.J.2878, Q.25, Q.28, Q.42, Q.47, Q.48, and Q.49.

Gin Gin Mill Area.

C.P.29/116, Co.290, Mahona, M.1900 Seedling, P.O.J.2714, P.O.J.2878, Q.25, Q.28, Q.42, Q.47, Q.48, Q.49, and Q.813.

Isis Mill Area.

C.P.29/116, Co.290, Co.301, P.O.J.213, P.O.J.2878, Q.25, Q.28, Q.42, Q.47, Q.48, and Q.49.

Maryborough Mill Area.

Pialba District.

C.P.29/116, Co.290, P.O.J.213, P.O.J.2878, Q.28, Q.42, Q.49, and Q.813.

Maryborough District.

C.P.29/116, Co.290, M.1900 Seedling, P.O.J.213, P.O.J.2878, Q.28, Q.42, Q.49, and Q.813. Q.25 may be planted only on those farms loading cane at sidings on the North Coast Line from Mungar South.

Mount Bauple Mill Area.

C.P. 29/116, Co.290, M.1900 Seedling, P.O.J.213, P.O.J.2878, Q.25, Q.28, Q.42, Q.49, and Q.813.

Moreton Mill Area.

Atlas, C.P.29/116, Co.290, Q.28, Q.42, Q.47, Q.49, Trojan, and Vesta.

Rocky Point Mill Area.

C.P.29/116, Co.290, H.Q.285, Oramboo, P.O.J.2878, Q.28, Q.42, Q.47, Q.49, Q.813, and Trojan.

NORMAN J. KING,
Director of Sugar Experiment Stations.

"THE SUGAR EXPERIMENT STATIONS ACTS, 1900 TO 1948."

Department of Agriculture and Stock,
Brisbane, 1st January, 1949.

APPROVED FODDER CANES.

ALL farmers are advised that the following are the varieties of cane which may be grown for fodder purposes in the sugar mill areas as set out below—

Hambledon and Mulgrave Mill Areas.

China, Uba, Co.290, and "Improved Fodder Cane."

Mossman, Babinda, Goondi, South Johnstone, Mourilyan, Tully, Victoria, Macknade, Invicta, Pioneer, Kalamia, and Inkerman Mill Areas.

Uba, Co.290, and "Improved Fodder Cane."

Proserpine, Cattle Creek, Racecourse, Farleigh, North Eton, Marian, Pleystowe, and Plane Creek Mill Areas.

China, Uba, and "Improved Fodder Cane."

Qunaba, Millaquin, Bingera, Fairymead, Gin Gin, Isis, Maryborough, Mount Bauple, Moreton, and Rocky Point Mill Areas.

90 Stalk, "Improved Fodder Cane," and C.S.R.1 (also known as E.G.).

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A. H. TUCKER, Government Printer, Brisbane.